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cephalus scoparius Howe is probably a condition of *C. luteofuscus* (Crouan) Börg. "developed under peculiar, most probably unfavourable external conditions of life" has been rejected by the authors of the monograph as also by Mr. F. S. Collins, though unfortunately it has been adopted by Wille in his recent Nachträge to the Engler & Prantl Natürlichen Pflanzenfamilien. In this connection it may be remarked that if any real evidence is ever brought forward to show that *Cladocephalus scoparius* and *C. luteofuscus* are forms of one species it may be contended with some justice that the legal name for the species will be *Cladocephalus scoparius*, inasmuch as the *Flabellaria luteofusca* of the Mazé and Schramm list remained essentially a *nomen nudum* until after the publication of *C. scoparius*.

An appendix to this admirable monograph contains Latin descriptions of the new genera and species proposed in the body of the work. Re-publication in this form has been considered desirable in order to conform to the requirements of the Vienna Rules, though it is pleasing to note that the authors have not ventured to reject a certain recently proposed specific name simply because it has never been accompanied by a Latin diagnosis.

Twenty-two handsome lithographed plates supplement in a most helpful manner this notable contribution to phycological literature.

MARSHALL A. HOWE.

OF INTEREST TO TEACHERS*

BIOLOGY FOR COLLEGE ENTRANCE

The new plan for admission to Harvard, which aims to improve articulation with secondary schools, especially public high schools, reduces the examinations to four, which must be taken at one time. A satisfactory record in these examinations will admit to Harvard College without conditions: (*a*) English, (*b*) Latin, or for candidate for the degree of S.B., French or German, (*c*) Mathematics, or Science (Physics or Chemistry), (*d*) any subject (not already selected under (*b*) or (*c*) from the following list: Greek, German, History, Mathematics, Chemistry, Physics. It will be noticed that botany (or zoölogy) is not mentioned here. Why is a question that might bring various answers, opening discussion and criticism of methods, adaptability and advisability of subject matter, and the cost of laboratories and biological materials. Many prominent teachers will also disagree as to the desirability of such intensive work in either botany (or zoölogy) as a position on the favored list may be supposed to indicate. Nevertheless there is no reason why the "open door" should not be offered to the biological sciences, be the applicants few or many.

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In a discussion regarding the order of high school science courses (*School Science and Mathematics*, February, 1911) W. Whitney describes the science groups recommended by the principals of the Chicago high schools and recently adopted by the Board of Education of Chicago. It surely is, as the author indicates, "the first time any secondary school has systematically offered such opportunities in science."

"It must be understood that this science group is only one of some eleven groups of courses from which pupils are to make their selection by groups. The first year's work is to include physiology a half year and physiography a half year. In the second and following years there are to be offered one and one half years each of botany, zoölogy, physics, and chemistry and a year of physiography. A half year of each of the first four is to be of a practical or applied nature. The student on reaching the second year may choose between the biological and the physical sciences. If he chooses the biological, he will take three years' work in these sciences and two years of the physical. If he chooses the physical, he will take three or four years of the physical and one or two years' work in biological science. In any event, he must have six years of science.

"All will agree with the claim that in any scientific course of studies, if it be is to worthy of the name, there should be opportunity for a second year's work in, at least, one physical and one biological science. There is no good reason why opportunity for advanced work should be given in business courses or in language courses and denied in the science courses. Science plays a large part in the affairs of man and should be given liberal treatment in any scheme of education."

An abstract of Dr. D. T. MacDougal's address before the Society of American Naturalists is given in *Science*, January 20, 1911. As an introduction the abstract lists the recent events in the field of evolution; gives brief statements of the present presentation of long-recognized evolutionary theories, such as isolation, geographical distribution, natural selection, and inheritance of acquired characters; and recent work showing organic responses, including the plant changes secured by MacDougal in treating the reproductive elements of seed plants with various solutions, by Gager in using radium, and by Zederbauer on *Capsella* by climatic changes. The different mutants of *Oenothera* secured in Amsterdam and New York are explained by the statement that "*latency* and *recessivity* of any character may be more or less influenced by the conditions attendant upon the hybridization." The abstract ends with a discussion of the permanency of acquired characters. Not all "environic effects induced in the laboratory or by transplantation are heritable, although these may be carried over for two or three generations: and no satisfactory basis has yet been found upon which it might be predicted that any effect would be ephemeral or permanent."

Speaking of color photography in botanical work, Franics Ramaley (*Science*, February 17) recommends that botanists "make use of the new color photography especially in studies of ecology and plant breeding. Many features of vegetation are brought out much more clearly than by ordinary photography. Thus, a moor with scattered shrubs or a lake-margin surrounded with belts of different plants can be well shown. In plant-breeding experiments the appearance of the different hybrids and extracted forms can be reproduced with much faithfulness. Colored plates from books are easily reproduced upon lantern slides. The exposure required is about 200 times that for an extra rapid isochromatic plate. Hence no 'snap shots' can be taken, but if the light is good there need be no difficulty in securing good results. Development can be carried out in an ordinary dark room. The solutions used are inexpensive and easily prepared."

The August (1910) issue of the *Popular Science Monthly* contains an article on the rôle of selection in plant breeding. Another on the rôle of hybridization follows it for October. Deprecating the lack of discrimination in a public, with a "reputation for always looking for the dollar sign," the writer wonders that horticultural novelties of limited use and small importance are received with loud acclaim, when new agricultural productions of great economic value are almost unnoted. As an example of the latter class a ten per cent. increase in yield in corn might be given—an increase which would add $100,000,000 yearly to the wealth of the nation.

The discussion of selection and hybridization are well illustrated with photographs—chiefly corn and tobacco. The lack of proper credit mentioned above is probably due to insufficient knowledge concerning these two methods; ignorance which these articles are well adapted to destroy, with regard to range in variation, technique, the difficulties to be overcome, their relation to the natural method of flower pollination, the evils of inbreeding, and the interpretation of results in the newer phraseology —such as Mendel's law.

Cereal cropping and soil sterilization (*Science*, February 10) are discussed by H. L. Bolley of the North Dakota Agricultural College. He mentions (1) the large yields of high quality on new soils, (2) the deterioration in amount and quality that soon sets in, (3) that neither the exhaustion theory nor the toxin theory can satisfactorily account for the failure of such virgin soils to produce the earlier characteristic yields, (4) the improvement in such soils due to soil sterilization, (5) the difference in conclusions reached by the Rothamsted workers and by Mr. Bolley; the injurious effect (after soil sterilization) upon the first growth of the (wheat) seedlings is thought to be due to fungi, parasitic upon the wheat itself rather than in the soils—fungi which with soil fungi account for the deterioration of wheat and other cereal crops, instead of protozoa affecting the ammonia-making bacteria as claimed by the Rothamsted workers.

In a paper read before Section G at Minneapolis Mr. Bolley describes several genera of imperfect fungi responsible for cereal crop deterioration (*Science*, February 17). The fact that quackgrass is a common host for most of these is thought to account for the destructive influence attributed to that plant.

The January *Plant World*, which by the way is appearing in a much more attractive cover, contains an article by Professor F. E. Lloyd on the behavior of tannin in persimmons. Recently several scientific papers have printed short articles on tannin, or have referred to problems connected with the presence of tannin in plant tissues. Professor Lloyd does not consider this paper his final word on the subject; nevertheless among his conclusions are: (1) the colloid character of tannin, (2) the cause of its insolubility (intimate and complete association with a second carrier, also a colloid), and (3) the absence of intercellular tannin in normal tissue.

Under "Some Useful Plants of Mexico" Dean Rusby describes (*Journal of New York Botanical Garden*, January, 1911) a large number of interesting plants of economic value in Mexico.

The Hawaii Agricultural Experiment Station calls attention to the perennial character and the vegetative propagation of the cotton plants grown there—older plants yielding sometimes a hundred cuttings each. The continuous growing season makes it possible to regulate the harvest time by judicious pruning—a great commercial gain.

Under "Soil Productivity" (*Science*, February 10) T. C. Chamberlin discusses (1) the early origin of soils and of soil vegetation; (2) the sources, wasting, and mixing of soils, the direct relation between film-water and productivity; (3) the great relative contact of soil air and the special advantage of its action; (4) the minute forms of plant and animal life which themselves more or less parasitic or predatory on each other modify the inorganic activities, and the fact that the "productivity of soils is measured more by the efficiency of its complex of activities than by any mere measure of its inorganic constituents"; (5) the importance of the capillary cycle in maintaining the supply of potash and phosphorus in the soils, and the selective action of certain soils in concentrating potash and phosphorus surfaceward; (6) that the capillary cycle and the plant cycle contribute to a potash and phosphorus cycle, and that "it is not, in the main, the *material substance* of the soil that is needed for food, but the *energy* locked up in grains, fruits, etc.," and therefore that the return of plants or their products to the soil is a most effective mode of maintaining soil productivity; (7) and that, despite alarming reports to the contrary, the lands most densely inhabited and intensely cultivated—at home and abroad—do, unit for unit, show an increase in productivity.

In answer to this Professor Cyril G. Hopkins has written a lengthy answer (*Science*, March 17) quoting the experiments at the Illinois State College and Rothamsted. At the latter place in a four-year rotation, including always a legume crop, "the yield of turnips decreased from 10 tons in 1848 to less than 1 ton per acre as an average for the last 20 years; that the barley decreased from 46 bushels in 1849 to 14 bushels as an average for the last 20 years; that the clover has decreased from 2.8 tons per acre in 1850 to less than one half-ton average since 1890; and that the wheat produced 30 bushels in 1851, and 33 bushels average during the next 12 years, but only 24 bushels since 1890, and 20 bushels per acre since 1900.

"As an average of the last twenty years the value of the four crops on the unfertilized land at Rothamsted is $33.83 (from four acres), but where the same crops were grown on adjoining land to which mineral plant food had been applied the average value is $76.83, the increase being 140 per cent. above the cost of the minerals."

Professor Hopkins therefore questions encouraging the Whitney "doctrine" that it is never necessary at any time to introduce fertilizing material into any soil for the purpose of increasing the amount of plant food in that soil.

NEWS ITEMS

At the University of Chicago the following promotions have been made in the department of botany: C. J. Chamberlin from assistant to associate professor; H. C. Cowles from assistant to associate professor; W. J. G. Land from instructor to assistant professor; and William Crocker from instructor to assistant professor.

Mr. E. L. Morris, curator of natural sciences at the Brooklyn Institute Museum, has been appointed acting curator-in-chief to fill the vacancy occasioned by Dr. F. A. Lucas's resignation. Dr. Lucas has been appointed director of the American Museum of Natural History, New York.

The University of Michigan's announcement for the summer session of its Biological Station includes several courses in botany under Dr. H. A. Gleason. The Station will be located in a tract stretching from Douglas to Burt Lakes, Cheboygan Co., Michigan. The session will extend from July 3 to August 25.

Mr. Carl Sherman Hoar has been appointed as an assistant in botany at Harvard University, and the following have been appointed Austin teaching fellows for 1911–1912: R. H. Colley, A. J. Eames, and E. W. Sinnott.

We learn from *Science* (June 9) that a party from the University of Nebraska will spend the time from June 15 to September 15 in making an ecological survey of the central and western parts of the state. Recording instruments will be set up at intervals and a particular study of the ecology of the sandhills will be undertaken. The party includes R. H. Wolcott, F. H. Shoemaker, R. J. Pool, and C. V. Williams.